

Beamline 22-BM / SER-CAT

Scientific focus: Macromolecular crystallography

Scientific program: Structural biology

Summary reflects projected performance parameters and planned equipment and hardware.

Optics & Optical Performance

- 6–20 keV standard spectral range
- 0.11 mm hor. x 0.06 mm vert. FWHM focused spot size
- Rosenbaum-Rock double-crystal monochromator water cooling
 - 1st crystals: Si(111), Si(220), Si(331)
25 mm W ea., common cooler carrier
 - 2nd crystals: Si(111), Si(220), Si(331)
sagittal focusing
exchangeable
125 mm L x 25 mm W
 - 6:1 demagnification
 - 6°–40° Bragg angle range
 - 35 mm beam offset (nominal)
- Rosenbaum-Rock vertical focusing mirror
 - 9:1 demagnification
 - ULE plane mirror substrate, 43 mm thick
 - 1000 mm L x 90 mm W
 - clear aperture
 - 2 Å rms roughness
 - 1 µrad rms surface figure error
 - Pt, none, Pd coating stripes (30 mm W ea.)
 - two motorized, encoded supports for angle and height adjustments
 - dynamic, independent bending mechanism at both ends
 - aberration correction via elliptical bending

Experiment Stations

22-BM-A

- white beam enclosure

22-BM-C

- white beam optics enclosure

22-BM-D

- monochromatic experiment station
- kappa goniostat for macromolecular crystallography
- adjustable collimator slits
- filter/shutter
- detector support and positioner

Detectors

- CCD area detector

Beamline Controls and Data Acquisition

- detector control and interface hardware and software to be defined
- beamline control and data acquisition software: MX system (some components to be defined)
- X86-Linux computers
- DC-servomotor; UMAC motor controller
- electrometer amplifiers; VME-based, computer-controlled V/F converter and scaler (ANL-ECT design)

Beamline Support Equipment/Facilities

- Rosenbaum-Rock miniaturized kappa goniostat
- high-magnification alignment cameras (two)
- Rosenbaum-Rock high-precision detector support and positioner
- liquid-nitrogen cryosystem sample cooler

Bending Magnet Source Characteristics (nominal)

source	APS bending magnet
critical energy	19.51 keV
on-axis peak brilliance at 16.3 keV	2.9×10^{15} ph/sec/mrad ² /mm ² /0.1%bw
on-axis peak angular flux at 16.3 keV	9.6×10^{13} ph/sec/mrad ² /0.1%bw
on-axis peak horizontal angular flux at 5.6 keV	1.6×10^{13} ph/sec/mradh/0.1%bw
source size at critical energy \sum_x \sum_y	145 µm 36 µm
source divergence at critical energy $\sum_{x'}$ $\sum_{y'}$	6 mrad 47 µrad